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Brocade VA-40FC

Hardware Reference Manual

BROCADE

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Brocade VA-40FC Hardware Reference Manual	53-1001540-02	Update document for Release 6.4.	March 2010
Brocade VA-40FC Hardware Reference Manual	53-1001540-03	BSMI compliance statement updated.	October 2011
Brocade VA-40FC Hardware Reference Manual	53-1001540-04	Chinese regulatory statement added	May 2012

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How this document is organized

This document is organized to help you find the information that you want as quickly and easily as possible.

The document contains the following components:

- Chapter 1, "Brocade VA-40FC Introduction," provides an overview of the Product Name switch, a feature list, and a look at the appearance of the switch.
- Chapter 2, "Brocade VA-40FC Installation and Configuration," provides the information needed to install the switch into your network.
- Chapter 3, "Brocade VA-40FC Operation," discusses the day-to-day operational procedures for using the switch.
- Appendix A, "Brocade VA-40FC Specifications," provides tables of physical, environmental, and general specifications, helpful for quick lookup.
- The Index points you to the exact pages on which specific information is located.

Supported hardware and software

Although many different software and hardware configurations are tested and supported by Brocade Communications Systems, Inc. for Fabric OS v6.2.x, documenting all possible configurations and scenarios is beyond the scope of this document.

This document is specific to the Brocade VA-40FC and Fabric OS vx.x.x. To obtain information about a Fabric OS version other than vx.x.x, see the documentation specific to that OS version.

What's new in this document

The Chinese regulatory statement has been added. "China statement."

Document conventions

This section describes text formatting conventions and important notice formats used in this document.

Text formatting

The narrative-text formatting conventions that are used are as follows:

bold text	Identifies command names Identifies the names of user-manipulated GUI elements Identifies keywords and operands Identifies text to enter at the GUI or CLI
italic text	Provides emphasis Identifies variables Identifies paths and Internet addresses Identifies document titles
`code` text	Identifies CLI output Identifies command syntax examples

For readability, command names in the narrative portions of this guide are presented in mixed lettercase: for example, **switchShow**. In actual examples, command lettercase is often all lowercase.

Command syntax conventions

Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
--**option, option**	Command options are printed in bold.
-**argument,** arg	Arguments.
[ ]	Optional element.
variable	Variables are printed in italics. In the help pages, values are underlined or enclosed in angled brackets < >.
...	Repeat the previous element, for example "member[;member...]"
value	Fixed values following arguments are printed in plain font. For example, --**show** WWN
|	Boolean. Elements are exclusive. Example: --**show** -**mode** egress | ingress

Notes, cautions, and warnings

The following notices and statements are used in this manual. They are listed below in order of increasing severity of potential hazards.

NOTE
A note provides a tip, guidance or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates potential damage to hardware or data.

CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you.

DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Key terms

For definitions specific to Brocade and Fibre Channel, see the *Brocade Glossary*.

For definitions of SAN-specific terms, visit the Storage Networking Industry Association online dictionary at:

http://www.snia.org/education/dictionary

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These references are made for informational purposes only.

Corporation	Referenced Trademarks and Products
IBM Corporation	IBM, FICON, PowerPC

Additional information

This section lists additional Brocade and industry-specific documentation that you might find helpful.

Brocade resources

To get up-to-the-minute information, go to http://my.brocade.com and register at no cost for a user ID and password.

For additional Brocade documentation, visit the Brocade SAN Info Center and click the Resource Library location:

http://www.brocade.com

Release notes are available on the My Brocade website (http://my.brocade.com) and are also bundled with the Fabric OS firmware.

Other industry resources

- White papers, online demos, and data sheets are available through the Brocade Web site at *http://www.brocade.com/products/software.jhtml*.
- Best practice guides, white papers, data sheets, and other documentation is available through the Brocade Partner Web site.

For additional resource information, visit the Technical Committee T11 Web site. This Web site provides interface standards for high-performance and mass storage applications for Fibre Channel, storage management, and other applications:

http://www.t11.org

For information about the Fibre Channel industry, visit the Fibre Channel Industry Association Web site:

http://www.fibrechannel.org

Getting technical help

Contact your switch support supplier for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information available:

1. General Information
    - Technical Support contract number, if applicable
    - Switch model
    - Switch operating system version
    - Error numbers and messages received
    - **supportSave** command output
    - Detailed description of the problem, including the switch or fabric behavior immediately following the problem, and specific questions
    - Description of any troubleshooting steps already performed and the results
    - Serial console and Telnet session logs
    - syslog message logs
2. Switch Serial Number

    The switch serial number and corresponding bar code are provided on the serial number label, as illustrated below.:

    The serial number label is located as follows:

    - Brocade 300, 4100, 4900, 5100, 5300, 7500, 7500E, 7800, 8000, VA-40FC, and Brocade Encryption Switch—On the switch ID pull-out tab located inside the chassis on the port side on the left
    - Brocade 5000—On the switch ID pull-out tab located on the bottom of the port side of the switch
    - Brocade 7600—On the bottom of the chassis
    - Brocade 48000—Inside the chassis next to the power supply bays
    - Brocade DCX—On the bottom right on the port side of the chassis
    - Brocade DCX-4S—On the bottom right on the port side of the chassis, directly above the cable management comb
3. World Wide Name (WWN)

    Use the **wwn** command to display the switch WWN.

    If you cannot use the **wwn** command because the switch is inoperable, you can get the WWN from the same place as the serial number, except for the Brocade DCX. For the Brocade DCX, access the numbers on the WWN cards by removing the Brocade logo plate at the top of the non-port side of the chassis.

Document feedback

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. Forward your feedback to:

documentation@brocade.com

Provide the title and version number of the document and as much detail as possible about your comment, including the topic heading and page number and your suggestions for improvement.

Chapter

Brocade VA-40FC Introduction

1

In this chapter

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Brocade VA-40FC overview

The Brocade VA-40FC is an Enterprise class 1U, 40-port Fibre Channel 1, 2, 4 or 8 Gbps Fibre Channel switch that offers the next generation Brocade, single-chip architecture for Storage Area Networks (SANs). The Brocade VA-40FC is designed to function in large-scale enterprise SANs and can also fit the requirements of small to medium-sized work groups.

Because the Brocade VA-40FC has a slim 1U height and a high port count, you can use the Brocade VA-40FC to create very dense fabrics in a relatively small space. With its flexible Ports On Demand (POD) capability, the Brocade VA-40FC provides excellent overall value as the foundation of a SAN with the ability to grow with an organization's SAN needs.

The Brocade VA-40FC is the latest mid-range offer from the Brocade family of entry-to-enterprise products. It supports the following features:

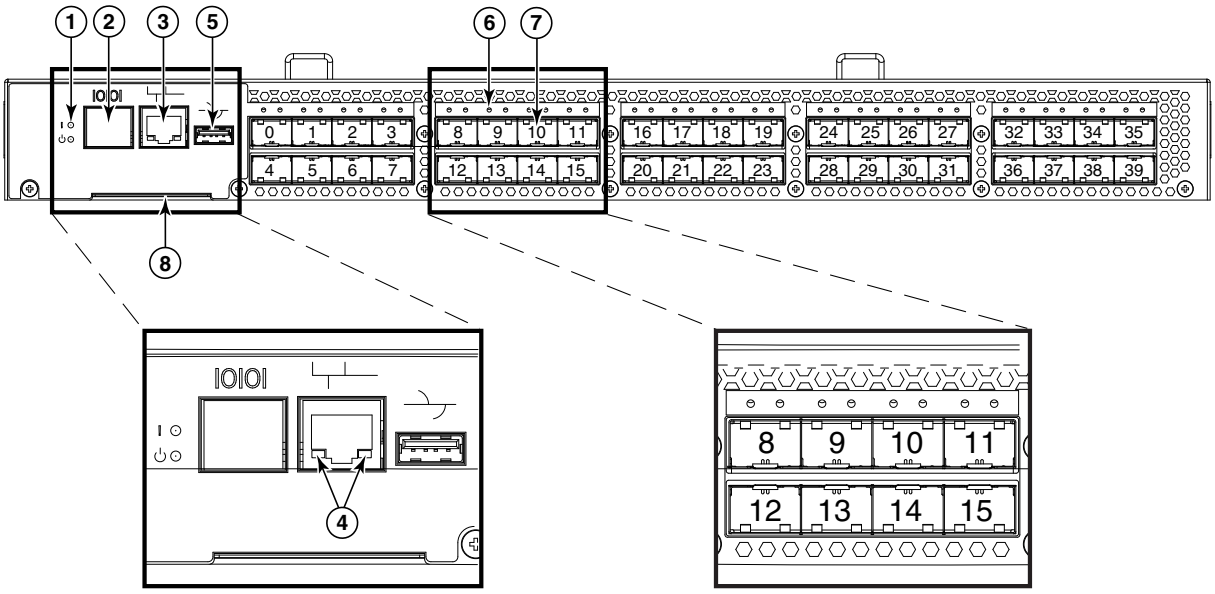
- Up to 40 ports of high-performance 8 Gbps technology and POD scaling from 24 to 32 or 40 ports.
- Support for 1, 2, 4, and 8 Gbps auto-sensing Fibre Channel switch and router ports.
- FICON®, FICON Cascading and FICON Control Unit Port ready.
- Two hot-swappable, redundant integrated power supply and fan FRUs.
- Universal ports that self-configure as E, F, M, or FL ports. Ex_Ports are activated on a per port basis with the optional Integrated Routing license.
- Fibre Channel Routing (FCR) service that provides improved scalability and fault isolation (through the optional Integrated Routing license).
- An RJ45 Ethernet management port, that in conjunction with EZSwitchSetup, supports switch IP address discovery and configuration, eliminating the need to attach a serial cable to configure the switch IP address and greatly increasing the ease of use.
- USB port that provides storage for firmware updates, output of the **supportSave** command and storage for configuration uploads and downloads

- Single motherboard design with 667 MHz PowerPC 440EPx Reduced Instruction Set Computer (RISC) CPU and integrated peripherals which provide high performance.
- Inter-Switch Link (ISL) Trunking (licensable), which allows up to eight ports (at 1, 2, 4, or 8 Gbps speeds) between a pair of switches combined to form a single, logical ISL with a speed of up to 128 Gbps full duplex for optimal bandwidth utilization and load balancing.
- Dynamic Path Selection (DPS), which optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient available path in the fabric.
- Rack-mount design using existing rail kits (fixed, sliding, and mid-mount/Telco rail kits) on a 19" EIA rack.
- Rack-mount design using fixed rack mount kit for 24" depth racks.
- Industry-leading extended distance support, which enables native Fibre Channel extension greater than 590 km.
- Expanded security for up to 16,000 hardware zones. Hardware zoning is accomplished at the port level of the switch or by World Wide Name (WWN). Hardware zoning permits or denies delivery of frames to any destination port address.
- Unicast, multicast (255 groups), and broadcast data traffic type, are support.
- Brocade Small Form-Factor Pluggable (SFP) or SFP+ optical transceivers support any combination of Short Wavelength (SWL), Long Wavelength (LWL) or Extended Long Wavelength (ELWL) optical media among the switch ports.
- Brocade Fabric Operating System (Fabric OS), which delivers distributed intelligence throughout the network and enables a wide range of value-added applications including Brocade Advanced Web Tools and Brocade Zoning. Optional Fabric Services include: Adaptive Networking with QoS, Brocade Extended Fabrics, Brocade Enhanced Group Management, Brocade Fabric Watch, ISL Trunking, Integrated Routing, and End-to-End Performance Monitoring (APM).
- Port-to-port latency minimized to 700 nanoseconds through the use of cut-through frame routing at 8 Gbps.
- Extensive diagnostics and system monitoring capabilities, which enhance high Reliability, Availability, and Serviceability (RAS).
- The Brocade EZSwitchSetup wizard, which makes SAN configuration a three-step point-and click task.

Port side of the Brocade VA-40FC

The port side of the Brocade VA-40FC includes the system status LED, console port, Ethernet port and LEDs, USB port, and Fibre Channel ports and the corresponding port status LEDs.

Figure 1 shows the port side of the Brocade VA-40FC.



1 System status (top) and power (bottom) LEDs

2 System RS232 console port (RJ-45)

3 System Ethernet port (RJ-45)

4 Ethernet port LEDs (green/amber)

5 USB port

6 Fibre Channel port status LED

7 Fibre Channel ports

8 Switch ID pull-out tab

FIGURE 1 Port-side view of the Brocade VA-40FC

Port Numbering

The Fibre Channel ports on the Brocade VA-40FC are numbered from left to right, in eight-port groups from 0 to 39 as illustrated in Figure 2.

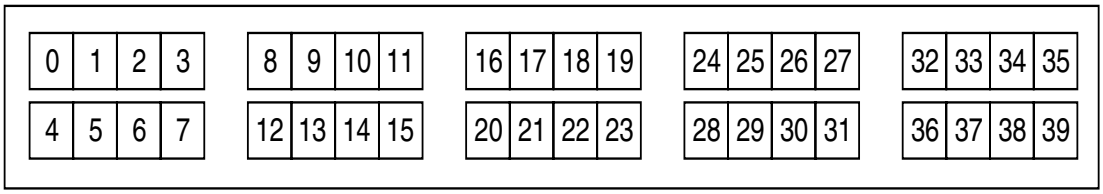


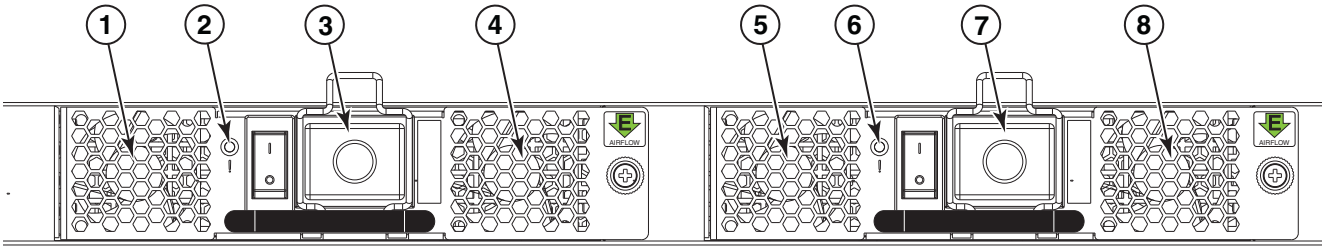
FIGURE 2 Port Numbering on the Brocade VA-40FC

ATTENTION
Brocade ISL Trunking is licensed software that allows you to create trunking groups of ISLs between adjacent switches. For more information about Brocade ISL Trunking, refer to the *Brocade Fabric OS Administrator's Guide*.

Non-port side of the Brocade VA-40FC

The non-port side of the Brocade VA-40FC includes the two redundant power supply-fan assemblies and the corresponding status LEDs.

Figure 3 shows the port side of the Brocade VA-40FC.



1 Fan (for power supply/fan FRU2)

2 Power supply/Fan status LED (for power supply/fan FRU 2)

3 Power supply connector (for power supply/fan FRU2)

4 Fan (for power supply/fan FRU2)

5 Fan (for power supply/fan FRU1)

6 Power supply/Fan status LED (for Power Supply/fan FRU 1)

7 Power supply connector (for power supply/fan FRU 1)

8 Fan (for power supply/fan FRU1)

FIGURE 3 Non-port side view of the Brocade VA-40FC

Field replaceable units (FRUs)

The Brocade VA-40FC has two integrated power supply/fan unit field replaceable units (FRUs). These power supply/fan assembly units are hot-swappable and redundant, and are capable of functioning universally without voltage jumpers or switches. The FRU units are identical and interchangeable.

The front panel has a status LED that provides the status of the entire switch, including the two power supply/fan FRUs.

The airflow for the Brocade VA-40FC is configured at the factory to have either the:

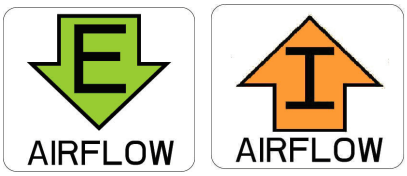
- Airflow exhaust at the non-port end.
- Airflow intake at the non-port end.

The fans inside a power supply/fan FRU either intake air or exhaust air from the chassis, depending on the model. Using the same P/N for all power supply/fan FRUs ensures identical airflow for all the FRUs on the chassis. When a replacement power supply/fan FRU is required, the same part number must be used and the FRU must match what was originally shipped in the Brocade VA-40FC.

The power supply/fan unit handle color is also an indicator of the of model type. The handles for the installed FRUs should be the same color.

Additionally, you can use external labels as a guide. Some power supply/fan units are labeled with an airflow symbol on the faceplate to indicate whether the unit intakes or exhausts air. However, not all power supply/fan units have an airflow symbol label.

FIGURE 4 Exhaust and intake airflow symbols for Power Supply/Fan FRUs



Ports on Demand license

The Brocade VA-40FC has 40 ports. By default, ports 0-24 are enabled. To enable additional ports, you must install Ports On Demand (POD) licenses.

To install a POD license, you can either use the supplied license key or generate a license key. Typically the switch is shipped with a paper pack that specifies the transaction key to use with the Software License Keys link. Use this transaction key on the Brocade Web site at *www.brocade.com/licensekeys* and follow the instructions to generate the key. You can also use this site to generate other license keys for your switch.

After you have installed the license keys, you must enable the ports. You can do so without disrupting switch operation by using the **portEnable** command on each port individually. Alternatively, you can disable and re-enable the switch to activate all ports simultaneously.

For detailed information on enabling additional ports using the POD license, refer to the *Fabric OS Administrator's Guide*.

ISL trunking groups

The Product Name supports Interswitch Link (ISL) Trunking as a licensed feature. When this feature is enabled, you can create trunked groups of up to eight contiguous ports, permitting a speed of up to 64 Gbps (128 Gbps full duplex).

NOTE
Brocade ISL Trunking is licensed software that allows you to create trunking groups of ISLs between adjacent switches. For more information about Brocade ISL Trunking, refer to the *Brocade Fabric OS Administrator's Guide*.

Fabric OS Native and Access Gateway modes

The Product Name can function in either Fabric OS Native mode or Brocade Access Gateway mode.

- The Product Name is shipped in Access Gateway mode by default. You do not need to configure Access Gateway if you use the default F_Port-to-N_Port mappings. You can change the default configuration the using command line interface (CLI) or WebTools, after you configure an IP address using instructions under "Switch IP address" on page 14.
- Access Gateway simplifies SAN deployment by using NPIV. NPIV provides Fibre Channel switch functions that improve Product Name scalability, manageability, and interoperability. For more information on Access Gateway, refer to the following:
  - For a list of Product Name F_Ports mapped to N_Ports as shipped from the factory, refer to "Access Gateway default port mapping" on page 27.
  - For general information and details on using Access Gateway, refer to the *Brocade Access Gateway Administrator's Guide.*
  - For specific instructions to prepare the edge fabric before connecting it to Access Gateway (since Access Gateway relies on NPIV technology for its connection to the edge fabric), refer to the *SAN TECH NOTE – Preparing to Install the Brocade Access Gateway)*.

  NOTE
  Access Gateway cannot be connected directly into an array; it requires a fabric to support NPIV.

- The features available to the Product Name depend on whether the switch is configured in Access Gateway or Fabric OS Native mode. For a list of available features for each mode, refer to the *Brocade Access Gateway Administrator's Guide.*
- The switch provides up to 32 internal copper backplane F_Ports. Each port can automatically negotiate its speed at 4 or 8 Gbps to match the highest speed supported by the attached devices.

- In Fabric OS Native mode, the switch provides up to 40 external autosensing (2, 4 and 8 Gbps) Fibre Channel ports. These universal and self-configuring ports are capable of becoming one of the following port types:
  - F_Port (fabric enabled)
  - FL_Port (fabric loop enabled)
  - E_Port (expansion port)
- In Access Gateway mode, the switch provides up to 40 autosensing (2, 4, and 8 Gbps) Fibre Channel ports. These are universal and self-configuring ports capable of becoming the following types:
  - F_Port (fabric enabled)
  - N_Port (fabric enabled)

Disabling and enabling Access Gateway mode

This section provides steps to disable and enable Access Gateway mode using Fabric OS commands. For more information on using these commands, refer to the "Enabling and disabling Access Gateway mode" section in the *Brocade Access Gateway Administrator's Guide* or the *Brocade Fabric OS Administrator's Guide*.

NOTE
You can also disable and enable Access Gateway mode using Web Tools. Refer to the See the *Web Tools Administrator's Guide* for more information.

Disabling Access Gateway mode

When you disable Access Gateway mode, The switch automatically reboots and comes back online using the fabric switch configuration. The Access Gateway parameters, such as F_Port-to-N_Port mapping, Failover, and Failback are automatically removed. When the switch reboots, it starts in Fabric OS Native mode. To re-join the switch to the core fabric, refer to the *Brocade Access Gateway Administrator's Guide*.

Use the following steps to disable Access Gateway mode using Fabric OS commands. For more information, refer to the "Enabling and disabling Access Gateway mode" section in the *Brocade Access Gateway Administrator's Guide*.

1. Enter the **switchshow** command to verify the switch mode.
   - "Access Gateway Mode" displays if the switch is in Access Gateway mode.
   - Interopmode "0" or "Native" displays if the switch is in Fabric OS Native mode.
2. Enter **switchDisable** to disable the switch. Access Gateway mode can only be disabled or enabled when the VA-FC40 is in a disabled state.
3. Enter **ag –modeDisable** to disable Access Gateway mode.
4. Enter the **ag --modeshow** command to verify that AG mode is disabled.

```
switch:admin> ag --modeshow
Access Gateway mode is NOT enabled
```

Enabling Access Gateway mode

Note the following when enabling Access Gateway mode:

- After you enable AG mode, some fabric information is erased, such as the zone and security databases.
- Enabling AG mode is disruptive because the switch is disabled and rebooted.
- Ensure that no zoning or Admin Domain (AD) transaction buffers are active. If any transaction buffer is active, enabling Access Gateway mode will fail with the error, "Failed to clear Zoning/Admin Domain configuration."

Use the following steps to enable Access Gateway mode using Fabric OS commands. For more information on enabling Access Gateway mode, refer to "Enabling and disabling Access Gateway mode" in the *Brocade Access Gateway Administrator's Guide*.

1. Before disabling a switch to enable Access Gateway mode, save the current configuration file using the **configupload** command in case you might need this configuration again.
2. Enter the **switchshow** command to verify the switch mode.
    - "Access Gateway Mode" displays for switchMode if the switch is in Access Gateway mode.
    - "Native" displays for switchMode if the switch is in Fabric OS Native mode.
3. Enter **switchDisable** to disable the switch. Access Gateway mode can only be enabled or disabled when the VA-FC40 is in a disabled state.
4. Enter **ag –modeEnable** to enable Access Gateway mode.
5. Enter the **ag --modeshow** command to verify that AG mode is enabled.

```
switch:admin> ag --modeshow
Access Gateway mode is enabled.
```

Chapter

Brocade VA-40FC Installation and Configuration 2

In this chapter

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- Installation and safety considerations 9
- Installing a standalone Product Name 12
- Cabinet installation for a Product Name 12
- Product Name configuration 13

Items included with the Product Name

The following items are included with the standard shipment of the Brocade VA-40FC. When you open the Product Name packaging, verify that these items are included in the package and that no damage has occurred during shipping:

- The Brocade VA-40FC switch, containing two power supply/fan assembly units
- One accessory kit containing:
  - Serial Cable with an RJ-45 connector
  - 6 ft. Power Cord
  - Rubber feet, required for setting up the switch as a standalone unit
  - Brocade VA-40FC Doc CD
  - *Brocade VA-40FC QuickStart Guide*
  - EZSwitchSetup CD

Installation and safety considerations

You can install the Product Name switch in the following ways:

1. As a standalone unit on a flat surface.
2. In an EIA cabinet using a fixed-rail rack mount kit. The optional fixed-rail rack mount kit can be ordered from your switch retailer.
3. In an EIA cabinet using an optional slide-rail rack mount kit. The optional slide-rail rack mount kit can be ordered from your switch retailer. When mounting into a slide-rail rack, you can mount the chassis to slide from either the port side or the non-port side.
4. In an EIA cabinet using an optional mid-mount rack kit for switches. The optional mid-mount rack kit for switches can be ordered from your switch retailer.
5. In an EIA cabinet using fixed rack mount kit (24 depth). The optional fixed rack mount kit for switches can be ordered from your switch retailer.

Electrical considerations

To install and operate the switch successfully, ensure the following:

- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the switch nameplate.
- The power supply standards provided in Table 5, "Power Supply Specifications" on page 29 are met.

Environmental considerations

For successful installation and operation of the switch, ensure that the following environmental requirements are met:

- At a minimum, adequate cooling requires that you install the switch with the cool-air intake set to either the port or non-port side, so that the cool-air intake matches the airflow type of the Power Supply/Fan FRU units present in the Brocade VA-40FC.

  Refer to "Power supply/fan assembly FRU replacement" on page 26 for more information on identifying the airflow type."
- All equipment in the rack should force air in the same direction to avoid intake of exhaust air.
- A maximum of 49.3 cubic meters/hour (29 cubic feet/minute) and a minimum of 37.4 cubic meters/hour (22 cubic feet/minute) of air flow is available to the air intake vents on the non-port side of the switch.
- The ambient air temperature does not exceed 40° C (104° F) while the switch is operating.

Cabinet considerations

For successful installation and operation of the switch in a cabinet, ensure the following cabinet requirements are met:

- The cabinet can be a standard EIA cabinet, or an EIA cabinet with 24" depth.
- Plan a cabinet space that is one rack unit (1U) high; 4.45 cm (1.75 inches) and 48.3 cm (19 inches) wide.
- Ground all equipment in the cabinet through a reliable branch circuit connection and maintain ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Ensure that airflow and temperature requirements are met on an ongoing basis, particularly if the switch is installed in a closed or multicabinet assembly.
- Verify that the additional weight of the switch does not exceed the cabinet's weight limits or unbalance the cabinet in any way.
- Secure the cabinet to ensure stability in case of unexpected movement, such as an earthquake.

Recommendations for cable management

The minimum bend radius for a 50 micron cable is 2 inches under full tensile load and 1.2 inches with no tensile load.

Cables can be organized and managed in a variety of ways. For example, you can use cable channels on the sides of the cabinet or patch panels to minimize cable management. Following is a list of recommendations:

NOTE
You should not use tie wraps with optical cables because they are easy to over tighten.

- Plan for rack space required for cable management before installing the switch.
- Leave at least 1 m (3.28 ft) of slack for each port cable. This provides room to remove and replace the switch, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.
- If you are using Brocade ISL Trunking, consider grouping cables by trunking groups. The cables used in trunking groups must meet specific requirements, as described in the *Fabric OS Administrator's Guide*.
- For easier maintenance, label the fiber optic cables and record the devices to which they are connected.
- Keep LEDs visible by routing port cables and other cables away from the LEDs.
- Use hook and loop style straps to secure and organize fiber optic cables.

Items required for installation

The following items are required for installing, configuring, and connecting the Product Name for use in a network and fabric:

- Workstation with an installed terminal emulator, such as HyperTerminal
- Unused IP address and corresponding subnet mask and gateway address
- Serial cable (provided)
- Ethernet cable
- SFPs and compatible cables, as required
- Access to an FTP server for backing up the switch configuration (optional)

Installing a standalone Product Name

Perform this task to install the Product Name as a standalone unit.

1. Unpack the Product Name and verify the items listed on "Items included with the Product Name" on page 9. Verify the items are present and undamaged.
2. Apply the adhesive rubber feet. Applying the rubber feet onto the switch helps prevent the switch from sliding off the supporting surface.
   a. Clean the indentations at each corner of the bottom of the switch to ensure that they are free of dust or other debris that might lessen the adhesion of the feet.
   b. With the adhesive side against the chassis, place one rubber foot in each indentation and press into place.
3. Place the switch on a flat, sturdy surface.
4. Provide power to the switch as described in "Providing power to the switch" on page 13.

ATTENTION
Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, see "Product Name configuration"

Cabinet installation for a Product Name

You must use one of four rack mount kits to install a Brocade VA-40FC in a cabinet. A rack mount kit can be installed in two ways:

- To allow the port side of the switch to slide out of the exhaust-air side of the cabinet. In this installation, the port side of the switch is flush with the edge of the cabinet.
- To allow the non-port side of the switch to slide out the cool-air side of the cabinet. In this installation, the port side of the switch is set 7.62 cm (3 inches) back from the edge of the cabinet, allowing a more gradual bend in the fiber optic cables.

Whichever mounting method you choose, follow the installation instructions shipped with the appropriate rack mount kit:

- To install the switch into a fixed-rail rack, refer to the *Fixed Rack Mount Kit Installation Procedure*.
- To install the switch into a slide-rail rack, refer to the *Slide Rack Mount Kit Installation Procedure*.
- To install the switch into mid-mount rack, refer to the *Mid-Mount Rack Mount Kit (Switch) Installation Procedure*.
- To install the switch into a fixed-rail rack, refer to the *Fixed Rack Mount Kit (24") Installation Procedure*.

Product Name configuration

Once you have set up the Product Name in a rack or as a standalone switch, it is time to give it power and a basic configuration. If you are going to use the Product Name in a single-switch setup, you can use EZSwitchSetup to complete the basic configuration.

See the *EZSwitchSetup CD*, included with the Product Name for more information. You can also use the *Brocade VA-40FC Quickstart Guide*.

If you do not want to use EZSwitchSetup, follow the instructions in the rest of this section.

Providing power to the switch

Perform the following steps to provide power to the Product Name.

1. Connect the power cords to both power supplies, and then to power sources on separate circuits to protect against AC failure. Ensure that the cords have a minimum service loop of 6 in. available and are routed to avoid stress.
2. Power on the power supplies by flipping both AC switches to the “1” symbol. The power supply LEDs display amber until POST is complete, and then change to green. The switch usually requires from 1 to 3 min to boot and complete POST.

ATTENTION
Power is supplied to the switch as soon as the first power supply is connected and turned on.

3. After POST is complete, verify that the switch power and status LEDs on the left of the port side of the switch are green.

Creating a serial connection

You will perform all basic configuration tasks in this guide using a serial connection.

Complete the following steps to create a serial connection to the switch.

1. Connect the serial cable to the serial port on the switch and to an RS-232 serial port on the workstation.

   If the serial port on the workstation is RJ-45 instead of RS-232, remove the adapter on the end of the serial cable and insert the exposed RJ-45 connector into the RJ-45 serial port on the workstation.

2. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM, TIP, or Kermit in a UNIX environment), and configure the application as follows:
   - In a Windows environment:

Parameter	Value
Bits per second	9600
Databits	8
Parity	None
Stop bits	1
Flow control	None

   - In a UNIX environment, enter the following string at the prompt:

     tip /dev/ttyb -9600

     If ttyb is already in use, use `ttya` instead and enter the following string at the prompt:

     tip /dev/ttya -9600

Switch IP address

You can configure the Product Name with a static IP address, or you can use a DHCP (Dynamic Host Configuration Protocol) server to set the IP address of the switch. DHCP is enabled by default. The Product Name supports both IPv4 and IPv6.

Using DHCP to set the IP address

When using DHCP, the Product Name obtains its IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the Product Name, use a static IP address.

Setting a static IP address

Perform the following steps to set a static IP address on the switch.

1. Log into the switch using the default password, which is password.
2. Use the **ipaddrset** command to set the Ethernet IP address.

   If you are going to use an IPv4 IP address, enter the IP address in dotted decimal notation as prompted.

   ```
   Ethernet IP Address: [192.168.74.102]
   ```

   If you are going to use an IPv6 address, enter the network information in semicolon-separated notation as prompted.

   ```
   switch:admin> ipaddrset -ipv6 --add 1080::8:800:200C:417A/64
   IP address is being changed...Done.
   ```

3. Complete the rest of the network information as prompted.

```
Ethernet Subnetmask: [255.255.255.0]
Ethernet IP Address: [192.168.74.102]
Ethernet Subnetmask: [255.255.255.0]
```

4. Enter off to Disable DHCP when prompted.

```
DHCP [OFF]: off
```

Date and time settings

The Product Name maintains the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for logging events. Switch operation does not depend on the date and time; a Product Name with an incorrect date and time value still functions properly. However, because the date and time are used for logging, error detection, and troubleshooting, you should set them correctly.

Time zones

You can set the time zone for the switch by name. You can also set country, city or time zone parameters.

If the time zone is not set with the new options, the switch retains the offset time zone settings. The **tsTimeZone** command includes an option to revert to the prior time zone format. For more information about the **--old** option, see the *Fabric OS Command Reference*.

You can set the time zone for a switch using the **tsTimeZone** command. The **tsTimeZone** command allows you to perform the following tasks:

- Display all of the time zones supported in the firmware
- Set the time zone based on a country and city combination or based on a time zone ID such as PST

The time zone setting has the following characteristics:

- You can view the time zone settings. However, only those with administrative permissions can set the time zones.
- The **tsTimeZone** setting automatically adjusts for Daylight Savings Time.
- Changing the time zone on a switch updates the local time zone setup and is reflected in local time calculations.
- By default, all switches are in the GMT time zone (0,0). If all switches in a fabric are in one time zone, it is possible for you to keep the time zone setup at the default setting.
- System services that have already started will reflect the time zone changes only after the next reboot.
- Time zone settings persist across failover for high availability.

Local time synchronization

You can synchronize the local time of the principal or primary fabric configuration server (FCS) switch to a maximum of eight external network time protocol (NTP) servers. To keep the time in your SAN current, it is recommended that the principal or primary FCS switch has its time synchronized with at least one external NTP server. The other switches in the fabric will automatically take their time from the principal or primary FCS switch.

All switches in the fabric maintain the current clock server value in non-volatile memory. By default, this value is the local clock server <LOCL> of the principal or primary FCS switch. Changes to the clock server value on the principal or primary FCS switch are propagated to all switches in the fabric.

When a new switch enters the fabric, the time server daemon of the principal or primary FCS switch sends out the addresses of all existing clock servers and the time to the new switch. If a switch with v5.3.0 or later has entered the fabric it will be able to store the list and the active servers; pre-5.3.0 Fabric OS switches will ignore the new list parameter in the payload and will update only the active server address.

If the active NTP server configured is IPv6, then distributing the same in the fabric will not be possible to switches earlier than v5.3.0 because IPv6 is supported for Fabric OS version 5.3.0 and later. The default value LOCL will be distributed to pre-5.3.0 switches.

The **tsClockServer** command accepts multiple server addresses in either IPv4, IPv6, or DNS name formats. When multiple NTP server addresses are passed, **tsclockserver** sets the first obtainable address as the active NTP server. The rest are stored as backup servers that can take over if the active NTP server fails. The principal or primary FCS switch synchronizes its time with the NTP server every 64 seconds.

Setting the date

Perform the following steps to set the date on the switch.

1. Log into the switch using the default password, which is password.
2. Enter the **date** command, using the following syntax:

   ```
   date "mmddHHMMyy"
   ```

   The values are:

   - mm is the month; valid values are 01 through 12.
   - dd is the date; valid values are 01 through 31.
   - HH is the hour; valid values are 00 through 23.
   - MM is minutes; valid values are 00 through 59.
   - yy is the year; valid values are 00 through 99 (values greater than 69 are interpreted as 1970 through 1999, and values less than 70 are interpreted as 2000-2069).

     ```
     switch:admin> date
     Fri Sep 29 17:01:48 UTC 2007
     switch:admin> date "0927123007"
     Thu Sep 27 12:30:00 UTC 2007
     switch:admin>
     ```

Setting time zones

You must perform the procedure on *all* switches for which the time zone must be set. However, you only need to set the time zone once on each switch, because the value is written to nonvolatile memory.

Use one of the two following procedures to set the time zone.

The following procedure describes how to set the current time zone using timezone_fmt mode to Central Standard time.

1. Log into the switch using the default password, which is password.
2. Enter the **tsTimeZone** command as follows:

   ```
   switch:admin> tstimezone [--interactive]/ [, timezone_fmt]
   ```

   Use **timezone_fmt** to set the time zone by Country/City or by time zone ID, such as PST.

   The following example shows how to change the time zone to US/Central.

   ```
   switch:admin> tstimezone
   Time Zone : US/Pacific
   switch:admin> tstimezone US/Central
   switch:admin> tstimezone
   Time Zone : US/Central
   ```

The following procedure describes how to set the current time zone using interactive mode to Pacific Standard Time.

1. Type the **tsTimeZone** command as follows:

   ```
   switch:admin> tstimezone --interactive
   ```

2. You are prompted to select a general location.

   ```
   Please identify a location so that time zone rules can be set correctly.
   ```

3. Enter the appropriate **number** or **Ctrl-D** to quit.
4. At the prompt, select a **country location**.
5. At the prompt, enter the appropriate **number** to specify the time zone region or **Ctrl-D** to quit.

Synchronizing local time using NTP

Perform the following steps to synchronize the local time using NTP.

1. Log into the switch using the default password, which is password.
2. Enter the **tsClockServer** command:

   ```
   switch:admin> tsclockserver "<ntp1;ntp2>"
   ```

   where *ntp1* is the IP address or DNS name of the first NTP server, which the switch must be able to access. The second *ntp2* is the second NTP server and is optional. The operand "<ntp1;ntp2>" is optional; by default, this value is LOCL, which uses the local clock of the principal or primary switch as the clock server.

   ```
   switch:admin> tsclockserver
   LOCL
   switch:admin> tsclockserver "132.163.135.131"

   switch:admin> tsclockserver
   132.163.135.131
   switch:admin>
   ```

   The following example shows how to set up more than one NTP server using a DNS name:

   ```
   switch:admin> tsclockserver "10.32.170.1;10.32.170.2;ntp.localdomain.net"
   Updating Clock Server configuration...done.
   Updated with the NTP servers

   Changes to the clock server value on the principal or primary FCS switch are
   propagated to all switches in the fabric
   ```

Chapter

Brocade VA-40FC Operation

3

In this chapter

- Powering the Brocade VA-40FC on and off 19
- LED activity interpretation. 19
- POST and boot specifications. 23
- Interpreting POST results 23
- Maintaining the Brocade VA-40FC 24
- Managing the Brocade VA-40FC. 27

Powering the Brocade VA-40FC on and off

To power the Brocade VA-40FC on, connect one or both power cords to the power connectors on the power supplies and to a power source; then, set the AC power switches to "I". Power is supplied to the switch as soon as the first power supply is connected and powered on.

The switch runs POST by default each time it is powered on; it can take up to several minutes to boot and complete POST.

To power the Brocade VA-40FC off, power off both power supplies by setting each AC power switch to "O". All devices are returned to their initial state the next time the switch is powered on.

LED activity interpretation

System activity and status can be determined through the activity of the LEDs on the switch. There are three possible LED states: no light, a steady light, and a flashing light. The lights are green or amber.

Sometimes, the LEDs flash either of the colors during boot, POST, or other diagnostic tests. This is normal; it does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete.

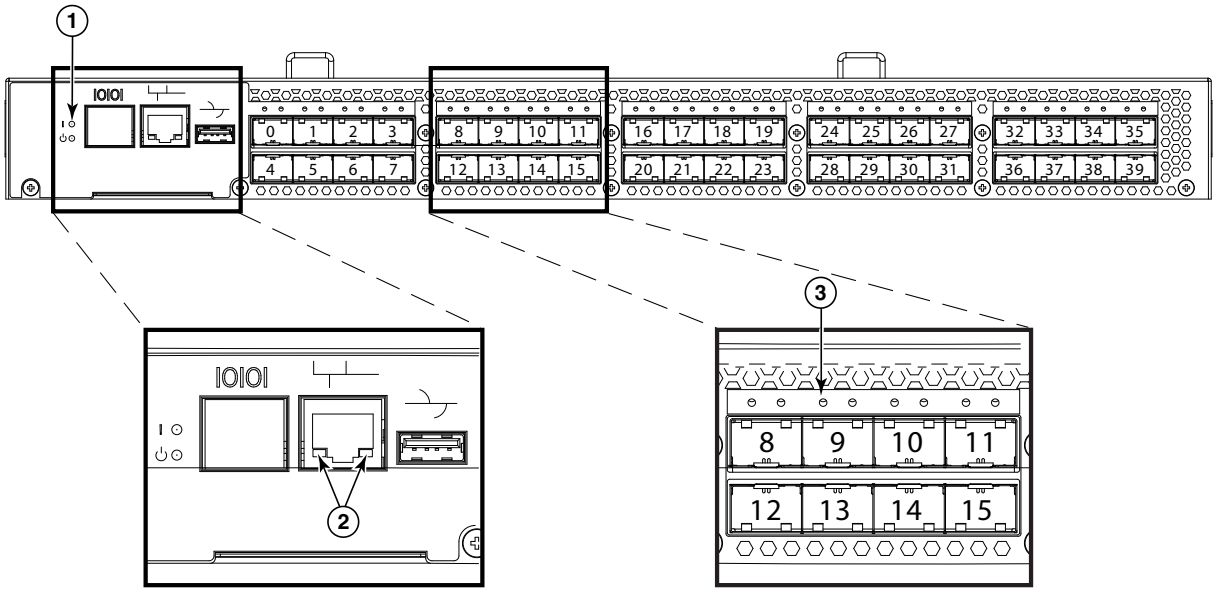
Brocade VA-40FC LEDs

The Brocade VA-40FC has the following LEDs:

- One system status LED (above) on the left side
- One power status LED (below) on the left side
- 40 port status LEDs, one for each Fibre Channel port, located above the ports
- One power supply status LED on each power supply FRU, to the left of the ON/OFF rocker switch on the non-port side of the switch

LED locations

Figure 5 shows the locations of the port side LEDs on the Brocade VA-40FC.



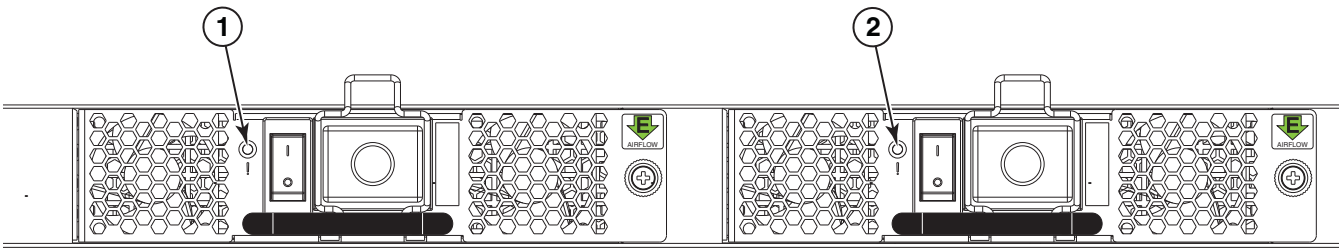
1 System status LED (top) and System power (bottom)

2 Ethernet port Status LEDs (green/amber)

3 FC port status (port 9)

FIGURE 5 Brocade VA-40FC port side LEDs

Figure 6 shows the non-port side LEDs on the Brocade VA-40FC.



1 Power supply status LED

2 Power supply status LED

FIGURE 6 Brocade VA-40FC non-port side LEDs

LED Patterns

Table 1 describes the LEDs and their actions on the switch.

TABLE 1 Brocade VA-40FC LED Patterns During Normal Operation

LED Name	LED Color	Status of Hardware	Recommended Action
Power Supply Status (right)	No light	Primary power cord is disconnected or is not actively powered, or power supply has failed.	Verify the power supply is on and seated and the power cord is connected to a functioning power source.
	Steady green	Power supply is operating normally.	No action required.
Power Status	No light	System is off or there is an internal power supply failure.	Verify the system is on. If the system is on, the unit is faulty. Contact Technical Support.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System Status	No light	System is off, boot is not complete, or boot failed.	Verify the system is on and has completed booting.
	Steady green	System is on and power supplies are functioning properly.	No action required.
	Steady amber (for more than five seconds)	Boot failed, the system is faulty.	Perform the following steps: Connect a serial cable to the system. Reboot the system. Check the failure indicated on the system console. Contact Technical Support.
	Flashing amber/green	Attention is required. A number of variables can cause this status including a single power supply failure, a fan failure, or one or more environmental ranges has exceeded.	Check the management interface and the error log for details on the cause of status. Contact Technical Support if required.
Ethernet Speed	No light	Port speed is 10 Mbps.	No action required.
	Steady green	Port speed is 100 Mbps.	No action required.
Ethernet Link	No light	There is no link.	Verify the Ethernet cable is connected correctly.
	Steady amber	There is a link.	No action required.
	Flickering amber	There is link activity (traffic).	No action required.

TABLE 1 Brocade VA-40FC LED Patterns During Normal Operation (Continued)

LED Name	LED Color	Status of Hardware	Recommended Action
Port Status	No light	No signal or light carrier (media or cable) detected.	Check transceiver and cable.
	Slow flashing green (flashing in two-second intervals)	Port is online but segmented because of a loopback cable or incompatible switch connection.	No action required.
	Fast flashing green (flashing in half-second intervals)	Port is online and an internal loopback diagnostic test is running.	No action required.
	Flickering green (steady with random flashes)	Port is online and frames are flowing through the port.	No action required.
	Steady green	Port is online (connected to external device) but has no traffic.	No action required.
	Slow flashing amber (flashing in two-second intervals)	Port is disabled (because of diagnostics or the **portDisable** command).	Verify the diagnostic tests are not running. Reenable the port using the **portEnable** command.
	Fast flashing amber (flashing in half-second intervals)	Port is faulty.	Check the management interface and the error log for details on the cause of status. Contact Technical Support if required.
	Steady amber (for more than five seconds)	Port is receiving light or signal carrier at 4 Gbps; but is not yet online.	No action required.
Power Supply/Fan FRU Status	Green	Power supply and fan operating normally.	No action required.
	Flashing green	Power supply or fan is faulty, FRU is powered down, or FRU is unplugged (while other FRU is pluuged in).	Power up or plug in the FRU, or replace the faulty FRU.

POST and boot specifications

When the switch is turned on or rebooted, the switch performs POST. Total boot time with POST can be several minutes. POST can be omitted after subsequent reboots by using the **fastboot** command or entering the **diagDisablePost** command to persistently disable POST.

For more information about these commands, refer to the *Fabric OS Command Reference Manual*.

POST

The success or failure results of the diagnostic tests that run during POST can be monitored through the error log or the command line interface.

POST includes the following tasks:

1. Conducts preliminary POST diagnostics.
2. Initializes the operating system.
3. Initializes hardware.
4. Runs diagnostic tests on several functions, including circuitry, port functionality, memory, statistics counters, and serialization.

Boot

In addition to POST, boot includes the following tasks after POST is complete:

1. Performs universal port configuration.
2. Initializes links.
3. Analyzes fabric. If any ports are connected to other switches, the switch participates in a fabric configuration.
4. Obtains a domain ID and assigning port addresses.
5. Constructs unicast routing tables.
6. Enables normal port operation.

Interpreting POST results

POST is a system check that is performed each time the switch is powered on, rebooted, or reset. During POST, the LEDs flash either amber or green. Any errors that occur during POST are listed in the error log.

Complete the following steps to determine whether POST completed successfully and whether any errors were detected:

1. Verify that the switch LEDs indicate that all components are healthy.

   See Table 1 for descriptions and interpretations of LED patterns. If one or more LEDs do not display a healthy state, verify that the LEDs on the switch are not set to “beacon” by entering the **switchShow** command to detect if beaconing is active.

2. Verify that the switch prompt displays on the terminal of a computer workstation connected to the switch.

   If there is no switch prompt when POST completes, press **Enter**. If the switch prompt still does not display, try opening a Telnet session or accessing the switch through another management tool. If this is not successful, the switch did not successfully complete POST. Contact your switch supplier for repair.

3. Review the switch system log for errors. Any errors detected during POST are written to the system log, accessible through the **errShow** command.

For information about all referenced commands, and on accessing the error log, refer to *Fabric OS Administrator's Guide*. For information about error messages, refer to the *Fabric OS Message Reference Manual*.

Maintaining the Brocade VA-40FC

The Brocade VA-40FC does not require any regular physical maintenance and is designed for high availability and to minimize the chance of failure. It includes diagnostic tests and field-replaceable units, described in the following sections.

Installing an SFP

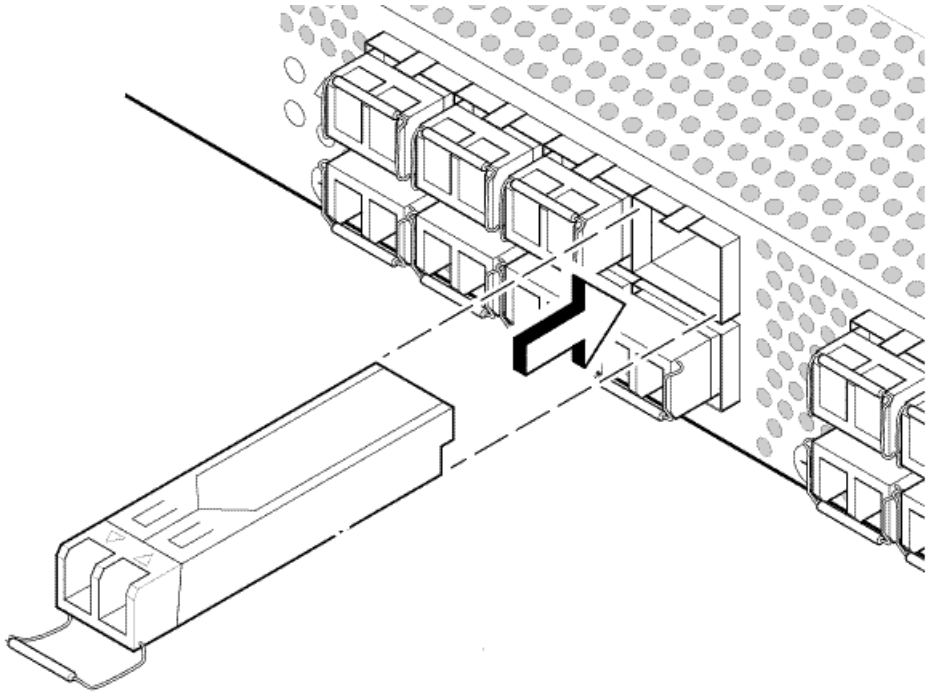
The Brocade VA-40FC only supports Brocade-branded SFPs. If you use an unqualified SFP, the **switchShow** command output shows the port in a Mod_Inv state. Fabric OS also logs the issue in the system error log.

Complete the following steps to install an SFP.

1. Making sure that the bail (wire handle) is in the unlocked position, place the SFP in the correctly oriented position on the port, as shown in Figure 7.
2. Slide the SFP into the port until you feel it click into place; then close the bail.

NOTE
Each SFP has a 10-pad gold-plated PCB-edge connector on the bottom. The correct position to insert an SFP into the upper row of ports is with the gold edge down. The correct position to insert an SFP into the lower row of ports is with the gold edge up.

FIGURE 7 Installing an SFP in the upper row of port slot



Diagnostic tests

In addition to POST, the Fabric OS includes diagnostic tests to help you troubleshoot the hardware and firmware. This includes tests of internal connections and circuitry, fixed media, and the transceivers and cables in use.

The tests are implemented by command, either through a Telnet session or through a terminal set up for a serial connection to the switch. Some tests require the ports to be connected by external cables, to allow diagnostics to verify the serializer/deserializer interface, transceiver, and cable. Some tests require loopback plugs.

Diagnostic tests are run at link speeds of 1, 2, 4, and 8 Gbps depending on the speed of the link being tested.

NOTE
Diagnostic tests might temporarily lock the transmit and receive speed of the links during diagnostic testing.

For information about specific diagnostic tests, refer to the *Fabric OS Troubleshooting and Diagnostics Guide.*

Field Replaceable Units (FRUs)

The power supplies have the fans inside and can be replaced onsite without the use of special tools. The power supply/fan assembly units are keyed to ensure correct orientation during installation. Replacement instructions are provided with all replacement units ordered.

Power supply/fan assembly FRU replacement

The Brocade VA-40FC fans are fixed inside the integrated power supply/fan FRU to provide necessary airflow to cool the whole system. There is one fan located in the rear section of each FRU. The system software sets fan speed and measures their speeds through the tachometer interface.

The two power supply/fan assembly FRU units are hot-swappable if replaced one at a time. They are identical and fit into either slot.

Fabric OS identifies the power supplies as follows (viewing the switch from the *port* side):

- Power supply #1 is on the left
- Power supply #2 is on the right

Determining power supply/fan replacement need

1. Use one of the following methods to determine whether a power supply requires replacement:
   - Check the power supply status LED next to the **I/O** switch. If the power supply status LED is not on, verify that the power supply is on and seated and the power cord is connected to a functioning power source. If the light does not turn green, the power supply needs to be replaced.
   - In Web Tools, click the **Power Status** icon.
   - Type the **psShow** command at the command prompt to display power supply status as shown below:

```
switch:admin> psshow

Power Supply #1 is OK
Power Supply #2 is OK
```

2. Use one of the following methods to determine whether a fan requires replacement:
   - Check the system status LED (see Figure 5 on page 20 for location of system status LED). If the system status LED is flashing amber and green, it could mean the fan has failed. The green power supply/fan LED will also flash in the event of failure. Check the management interface and the error log for details on the cause of status.
   - In Advanced Web Tools, check the **Fan Status** icon background color. It will be either yellow or red if the fan has failed. When the fan is functioning correctly, the background color is green.

- Type the **fanShow** command at the command prompt to display fan status as shown below:

```
switch:admin> fanshow
Fan 1 is OK, speed is 7105 RPM
Fan 2 is OK, speed is 7258 RPM
```

For further information on replacing the power/fan units, see the Brocade VA-40FC *Power Supply and Fan Assembly Replacement Procedure*.

Managing the Brocade VA-40FC

You can use the management functions built into the Brocade VA-40FC to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging.

The Brocade VA-40FC automatically performs power-on-self-test (POST) each time it is turned on. Any errors are recorded in the error log. For more information about POST, see "POST and boot specifications" on page 23.

For information about upgrading the version of Fabric OS installed on your switch, refer to the *Fabric OS Administrator's Guide.*

You can manage the Brocade VA-40FC using any of the management options listed in Table 2.

TABLE 2 Management Options for the Brocade VA-40FC Switch

Management Tool	Out-of-band Support	In-band Support
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously. For more information, refer to the *Fabric OS Administrator's Guide* and the *Fabric OS Command Reference Manual*.	Ethernet or serial connection	IP over Fibre Channel
Brocade Web Tools For information, refer to the *Web Tools Administrator's Guide*.	Ethernet or serial connection	IP over Fibre Channel
Standard SNMP applications For information, refer to the *MIB Reference Manual*.	Ethernet or serial connection	IP over Fibre Channel
Brocade Data Center Fabric Manager (DCFM) (option to purchase) For information, refer to the *Data Center Fabric Manager User Manual*.	Ethernet or serial connection	IP over Fibre Channel
Management Server For information, refer to the *Fabric OS Administrator's Guide* and the *Fabric OS Command Reference Manual*.	Ethernet or serial connection	Native in-band interface (over HBA only)

NOTE
To achieve in-band support for IP over Fibre Channel, the software must be run on both the HBA and the switch, and it must be supported by both the HBA and HBA driver.

Appendix

Brocade VA-40FC Specifications

A

In this appendix

- Access Gateway default port mapping 27
- Switch components 28
- Weight and physical dimensions 28
- Facility requirements 29
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- General specifications 30
- Data transmission ranges 31
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Access Gateway default port mapping

The Brocade VA-40FC can contain 40 total ports. Of these, F_Ports are ports 0-31 and N_Ports are ports 32-39.

The following lists the factory-default F_Port to N_Port mapping for Access Gateway mode.

NOTE
Ports 32-39 are N_ports with failover and failback enabled.

- 0-3 mapped to 32
- 8-11 mapped to 34
- 16-19 mapped to 36
- 24-27 mapped to 38
- 4-7 mapped to 33
- 12-15 mapped to 35
- 20-23 mapped to 37
- 28-31 mapped to 39

For more information on changing port mapping, managing ports., and default policy settings for Access Gateway Mode, refer to the *Access Gateway Administrator's Guide*.

Switch components

The Brocade VA-40FC switch includes the following components:

- Cabinet-mountable 1U chassis, designed for a 19-inch cabinet space, including 24-inch depth also, with forced-air cooling that flows in the same direction as the airflow of the Power Supply/Fan FRU units present in the Brocade VA-40FC.

  Refer to "Power supply/fan assembly FRU replacement" on page 26 for more information on identifying the airflow type."
- 40 Fibre Channel ports, compatible with short wavelength (SWL), long wavelength (LWL), and extended long wavelength (ELWL) SFP transceivers
- One RJ-45 serial port on the port side of the switch
- One IEEE-compliant RJ-45 connector on the port side of the switch for use with 10/100 Mbps Ethernet
- 40 port LEDs, 1 switch power LED, 1 switch status LED, 2 Ethernet LEDs, and 2 power supply LEDs
- One USB port for system log file downloads or firmware upgrades
- Two universal AC input and redundant power supplies with AC switches and built-in fans

Weight and physical dimensions

Table 3 lists the weight and dimensions of the Brocade VA-40FC.

TABLE 3 Physical Specifications

Dimension	Value
Height	1U = 43 mm (1.7 inches)
Depth	455.50 mm (17.6 inches)
Width	428.75 mm (16.9 inches)
Weight (with two power supply/fan assembly units installed, no SFPs)	8.3 kg (18.4 lbs)

Facility requirements

Table 4 provides the facilities requirements that must be met for the Brocade VA-40FC.

TABLE 4 Facility Requirements

Type	Requirements
Electrical	• Primary AC input 100-240 VAC, 2.0A, 47-63 Hz; switch autosenses input voltage • Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate • Circuit protected by a circuit breaker and grounded in accordance with local electrical codes Refer to Table 5 on page 29 for complete power supply specifications.
Thermal	• A minimum air flow of 79.8 cubic meters/hour (47 cubic ft/min.) available in the immediate vicinity of the switch • Ambient air temperature not exceeding 40° C (104° F) while the switch is operating
Cabinet (when rack-mounted)	• One rack unit (1U) in a 48.3 cm (19-inch) cabinet. Can be a 24” depth cabinet also. • All equipment in cabinet grounded through a reliable branch circuit connection • Additional weight of switch not to exceed the cabinet’s weight limits • Cabinet secured to ensure stability in case of unexpected movement

Power supply specifications

The power supplies are universal and capable of functioning worldwide without voltage jumpers or switches. They meet IEC 61000-4-5 surge voltage requirements and are autoranging in terms of accommodating input voltages and line frequencies. Each power supply has a built-in fan for cooling, pushing air towards the port side of the switch.

Table 5 lists the power supply specifications for the Brocade VA-40FC.

TABLE 5 Power Supply Specifications

Specification	Value
Inlet	C13
Maximum output of one power supply	125 Watts
System power consumption	84 Watts nominal, 91 Watts Maximum
Input voltage	85 - 264 VAC, Universal
Input line frequency	47 - 63 Hz
BTU rating	406 BTU/hr
Inrush current	35 Amps Maximum

Environmental requirements

Table 6 lists the acceptable environmental ranges for both operating and nonoperating (such as during transportation or storage) conditions.

TABLE 6 Environmental Requirements

Condition	Acceptable During Operation	Acceptable During Non-Operation
Ambient Temperature	0° to 40° Celsius (32° to 104° Fahrenheit)	-25° to 70° Celsius (-13° to 158° Fahrenheit)
Humidity	10% to 85% RH non-condensing, at 40° Celsius (104° Fahrenheit), with maximum gradient of 10% per hour	10% to 90% RH non-condensing, at 70° Celsius (158° Fahrenheit)
Altitude	3,000 meters (9,842 feet) above sea level	0 to 12 kilometers (39,370 feet) above sea level
Shock	20 G, 6 ms, half-sine wave	Half sine, 33G 11ms, 3/e.g. Axis
Vibration	0.5 G sine, 0.4 grms random, 5-500 Hz	2.0 G sine, 1.1 grms random 5-500 Hz
Air flow	High speed, 13,000 RPM, 49.3 CMH (29 CFM) Low speed, 7000 RPM, 37.4 CMH (22 CFM)	None required

General specifications

Table 7 lists the general specifications for the Brocade VA-40FC.

TABLE 7 General Specifications

Specification	Description
Configurable port types	E_Port, F_Port, FL_Port, M_Port, and EX_Port
System architecture	Nonblocking shared-memory switch
System processor	Power PC 440EPX,667 MHz CPU
ANSI Fibre Channel protocol	FC-PH (Fibre Channel Physical and Signalling Interface standard)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6
FC-IP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile
Aggregate switch I/O bandwidth	640 Gbps if all 40 ports are running at 8 Gbps, full duplex
Port-to-port latency	700 nanoseconds

Data transmission ranges

Table 8 provides the data transmission ranges for different cable types and port speeds.

TABLE 8 Laser Data Transmission Ranges

Port Speed	Cable Size (microns)	Short Wavelength (SWL)	Long Wavelength (LWL)	Extended Long Wavelength (ELWL)
1 Gbps	50	500 m (1,640 ft) (OM2) 860 m (2,821 ft) (OM3)	NA	NA
	62.5	300 meters (984 feet)	NA	NA
	9	NA	10 km (6.2 miles)	40 km (24.8 miles)
2 Gbps	50	300 m (984 ft) (OM2) 500 m (1,640 ft) (OM3)	NA	NA
	62.5	150 m (492 feet)	NA	NA
	9	NA	10 km (6.2 miles) without a Brocade Extended Fabrics license; 50 to 100 km with a Brocade Extended Fabrics license	40 km (24.8 miles)
4 Gbps	50	150 m (492 ft) (OM2) 380 m (1,246 ft) (OM3)	NA	NA
	62.5	70 m (230 feet)	NA	NA
	9	NA	NA	NA
8 Gbps	50	50 m (164 ft) (OM2) 150 m (492 ft) (OM3)	NA	NA
	62.5	21 m (69 feet)	NA	NA
	9	NA	10 km	NA

Memory specifications

The Brocade VA-40FC has three types of memory devices.

TABLE 9 Brocade VA-40FC memory specifications

Type	Size
Boot flash	4 MB
Compact flash	1 GB
Main memory (SDRAM)	512 MB

Fibre Channel port specifications

The Fibre Channel ports in the Brocade VA-40FC are compatible with SWL, LWL, and ELWL SFP transceivers. The strength of the signal is determined by the type of transceiver in use.

The ports meet all required safety standards. For more information about these standards, see "Regulatory compliance" on page 32.

The ports are capable of operating at 1, 2, 4, or 8 Gbps and are able to autonegotiate to the higher speed.

Serial port specifications

The serial port is located on the port side of the switch. The Brocade VA-40FC uses an RJ-45 connector for the serial port.

NOTE
To protect the serial port from damage, keep the cover on the port when not in use.

The serial port can be used to connect to a workstation to configure the switch IP address before connecting the switch to a fabric or IP network. The serial port's parameters are fixed at 9600 baud, 8 data bits, and no parity, with flow control set to None.

This connector is for initial IP address configuration and for recovery of the switch to its factory default settings if Flash memory contents are lost. The serial port is not intended for performance of normal administration or maintenance functions. You should only use this port to connect a terminal to the port to re-initialize the switch defaults, restoring the switch to its factory configuration. This is required to restore switch passwords to a known state and allow you to assign an IP address to the switch.

Table 10 lists the serial cable pinouts.

TABLE 10 Serial Cable Pinouts

PIN	Signal	Description
1	Not supported	NA
2	Not supported	NA
3	UART1_TXD	Transmit data
4	GND	Logic ground
5	GND	Logic ground
6	UART1_RXD	Receive data
7	Not supported	NA
8	Not supported	NA

Regulatory compliance

This section describes the regulatory compliance requirements for the Brocade VA-40FC switch. It contains:

- "FCC warning (US only)," next
- "KCC statement (Republic of Korea)" on page 33
- "VCCI statement Japan" on page 33
- "Power cords (Japan Denan)" on page 34

- "China statement" on page 35
- "BSMI statement (Taiwan)" on page 36
- "CE statement" on page 36
- "Canadian requirements" on page 36
- "Laser compliance" on page 36
- "RTC battery" on page 36
- "Electrical safety" on page 37
- "Regulatory certifications" on page 37

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

KCC statement (Republic of Korea)

A급 기기 (업무용 방송통신기기): 이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

VCCI statement Japan

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるように要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

Power cords (Japan Denan)

注意 – 添付の電源コードを他の装置や用途に使用しない
添付の電源コードは本装置に接続し、使用することを目的として設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないでください。火災や感電の原因となる恐れがあります。

China statement

China-CCC Warning statements

在维修的时候一定要断开所有电源（English translation“disconnect all power sources before service”）

For non tropical use:

安全说明和标记	汉文	“仅适用于非热带气候条件下安全使用。”
	藏文	《ཕྱིས་ཀྱི་ ཆུའུ་ ཐུག་ མཁའ་ཤས་ ཅན་ ཡུལ་ཁྲོད་ ཏུ་ རྐྱེན་ མེད་ པར་ ལག་ལེན་ བྱེད་ དགོས་ ཞེས་ བཀའ་ཡི་ ཡིག་ཆ་ ཡིན་ནོ་ །།》
	蒙古文	“ᠵᠠᠪᠠᠨ ᠳᠤ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠳᠡᠢ ᠭᠠᠵᠠᠷ ᠤᠨ ᠤᠷ ᠠᠮᠰᠢᠯᠲᠠ ᠳᠤ ᠠᠶᠤᠯᠭᠦᠢ ᠪᠠᠢᠳᠠᠯ ᠳᠤ ᠵᠥᠪᠬᠡᠨ ᠬᠡᠷᠡᠭᠯᠡᠬᠦ ᠪᠠᠢᠳᠠᠯ ᠲᠠᠢ ᠪᠠᠢᠬᠤ ᠶᠡᠬᠡ ᠵᠠᠭᠪᠤᠷ

BSMI statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求採取某些適當的對策。

Warning:

This is Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE statement

ATTENTION
This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on the Product Name contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EEC
- Low Voltage Directive (LVD) 2006/95/EC
- EN50082-2/EN55024:1998 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Laser compliance

This equipment contains Class 1 laser products and complies with FDA Radiation Performance Standards, 21 CFR Subchapter I and the international laser safety standard IEC 825-2.

ATTENTION
Use only optical transceivers that are qualified by Brocade Communications Systems, Inc. and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 825-2. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

RTC battery

ATTENTION
Do not attempt to replace the real-time clock (RTC) battery. There is danger of explosion if the battery is incorrectly replaced or disposed of. Contact your switch supplier if the real-time clock begins to lose time.

Electrical safety

ATTENTION
This switch might have more than one power cord. To reduce the risk of electric shock, disconnect both power cords before servicing.

ATTENTION
Connect the power cord only to a grounded outlet.

ATTENTION
This product is designed for an IT power system with phase-to-phase voltage of 230V. After operation of the protective device, the equipment is still under voltage if it is connected to an IT power system.

Regulatory certifications

Table 11 lists the EMC compatibility for the Product Name.

TABLE 11 EMC (electromagnetic compatibility)

Country	Safety	EMC
United States	Bi_Nat UL/CSA 60950-1 1st Ed or latest	ANSI C63.4
Canada	Bi_Nat UL/CSA 60950-1 1st Ed or latest	ICES-003 Class A
Japan		CISPR22 and JEIDA (Harmonics)
European Community	EN60950-1 or latest	EN55022 and EN55024
Australia/New Zealand		EN55022 or CISPR22 or AS/NZS CISPR22
Argentina	IEC60950-1 or latest	
Russian Federation	IEC60950-1 or latest	51318.22-99 and 51318.24.99
Korea		KN22 and KN24
China (PS only)	GB4943-2001 and GB9254-1998 or latest	GB17625.1-2003 or latest
Taiwan (PS only)	CNS 14336(94) or latest	CNS 13438(95) or latest

Environmental regulation compliance

This section describes the "China RoHS" environmental regulatory compliance requirements for the Brocade VA-40FC switch.

China RoHS

The contents included in this section are per the requirements of the People's Republic of China-Management Methods for Controlling Pollution by Electronic Information products.

遵守环境法规
中国 **RoHS**
本节中包含的内容都遵守了中华人民共和国《电子信息产品污染控制管理办法》的要求。

Environmental protection use period (EPUP) disclaimer

In no event do the EPUP logos shown on the product and FRUs alter or expand that warranty that Brocade provides with respect to its products as set forth in the applicable contract between Brocade and its customer. Brocade hereby disclaims all other warranties and representations with respect to the information contained on this CD including the implied warranties of merchantability, fitness for a particular purposes and non-infringement.

The EPUP assumes that the product will be used under normal conditions in accordance with the operating manual of the product.

环保使用期限 **(EPUP)** 免责声明：
EPUP 标志不会出现在产品和 FRU 的改装产品中，也不会对 Brocade 所提供的相关产品保修条款（该保修条款在 Brocade 及其客户间达成的适用合同中列出）进行增补。对于此 CD 上包含的相关信息，如适销性、针对特定用途的适用性和非侵权性的暗示保证，Brocade 在此郑重声明本公司对于与上述信息相关的所有其他保证和陈述概不负责。EPUP 假设在“产品操作手册”中注明的常规条件下使用该产品。

TS/HS dual language sheet

In accordance with China's Management Measures on the Control of Pollution caused by Electronic Information products (Decree No. 39 by the Ministry of Information Industry), the following information is provided regarding the names and concentration level of Hazardous substances (HS) which may be contained in this product.

TABLE 12 China ROHS hazardous substances/toxic substances (HS/TS) concentration chart

Name of the Component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Fibre Channel Switch	X	O	O	O	O	O
Fan, Blower assemblies	X	O	O	O	O	O
PCBA cards	X	O	O	O	O	O
Power Supply kit	X	O	O	O	O	O
SFPs (optical cable connectors)	X	O	O	O	O	O
Sheet Metal	X	O	O	O	O	O
Chassis Assembly	X	O	O	O	O	O
Mechanical brackets and Slides	X	O	O	O	O	O
Slot Filler	X	O	O	O	O	O

TABLE 12 China ROHS hazardous substances/toxic substances (HS/TS) concentration chart (Continued)

Name of the Component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Cable management tray	X	O	O	O	O	O
Cable Comb	O	O	O	O	O	O
Cables and power cords	O	O	O	O	O	O
Replacement Doors	X	O	O	O	O	O
Software/ Documentation CDs	O	O	O	O	O	O

X indicates that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/T11363-2006 Requirements for Concentration Limits.

O indicates that no such substances are used or that the concentration is within the aforementioned limits.

CHINA ROHS 有害物质/有毒物质(HS/TS)限量列表

有毒与有害物质或元素的名称及含量

根据中国的<<电子信息产品污染控制管理办法>> (信息产业部第 39 号令)，本公司提供以下有关产品中可能含有的有害物质(HS)的名称及含量水平的信息。

主要部件名称	有害/有毒物质或元素					
	铅（Pb）	汞（Hg）	镉（Cd）	六价铬（CR6+）	多溴联苯（PBB）	多溴二苯醚（PBDE）
光纤通道交换机	X	O	O	O	O	O
风扇/冷却组装件	X	O	O	O	O	O
线路板部件	X	O	O	O	O	O
USB 闪存器	O	O	O	O	O	O
电源	X	O	O	O	O	O
SFP（光纤接头）	X	O	O	O	O	O
钣金件	X	O	O	O	O	O
机箱部件	X	O	O	O	O	O
机械支架及滑轨	X	O	O	O	O	O
插槽填充物	X	O	O	O	O	O
电缆整理盘	X	O	O	O	O	O
梳状线缆	O	O	O	O	O	O
线束及电源线	O	O	O	O	O	O
替换门	X	O	O	O	O	O
软件/文档光盘	O	O	O	O	O	O

X　　表示此类部件内同质材料中的有害/有毒含量高于 SJ/T11363-2006 的限量要求。

O　　表示未使用此类物质或其含量低于上述限量要求。

A Environmental regulation compliance

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